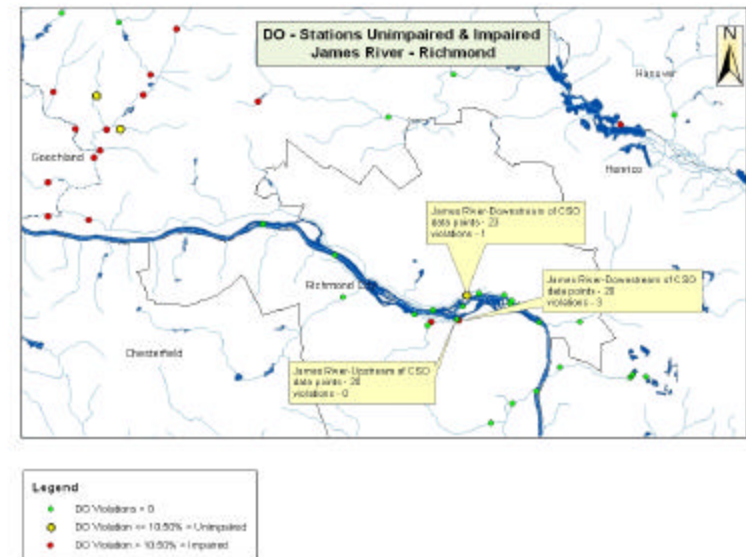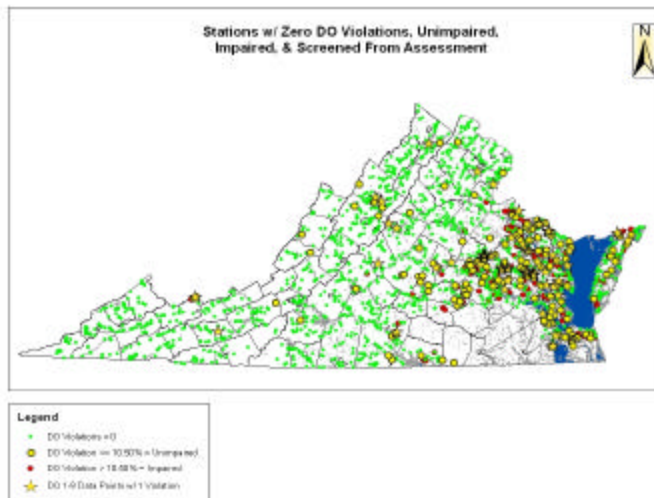# 10.5% Rule

Maps Indicating Location of Assessed, Not Assessed Stations*

For DO, pH, & Temperature
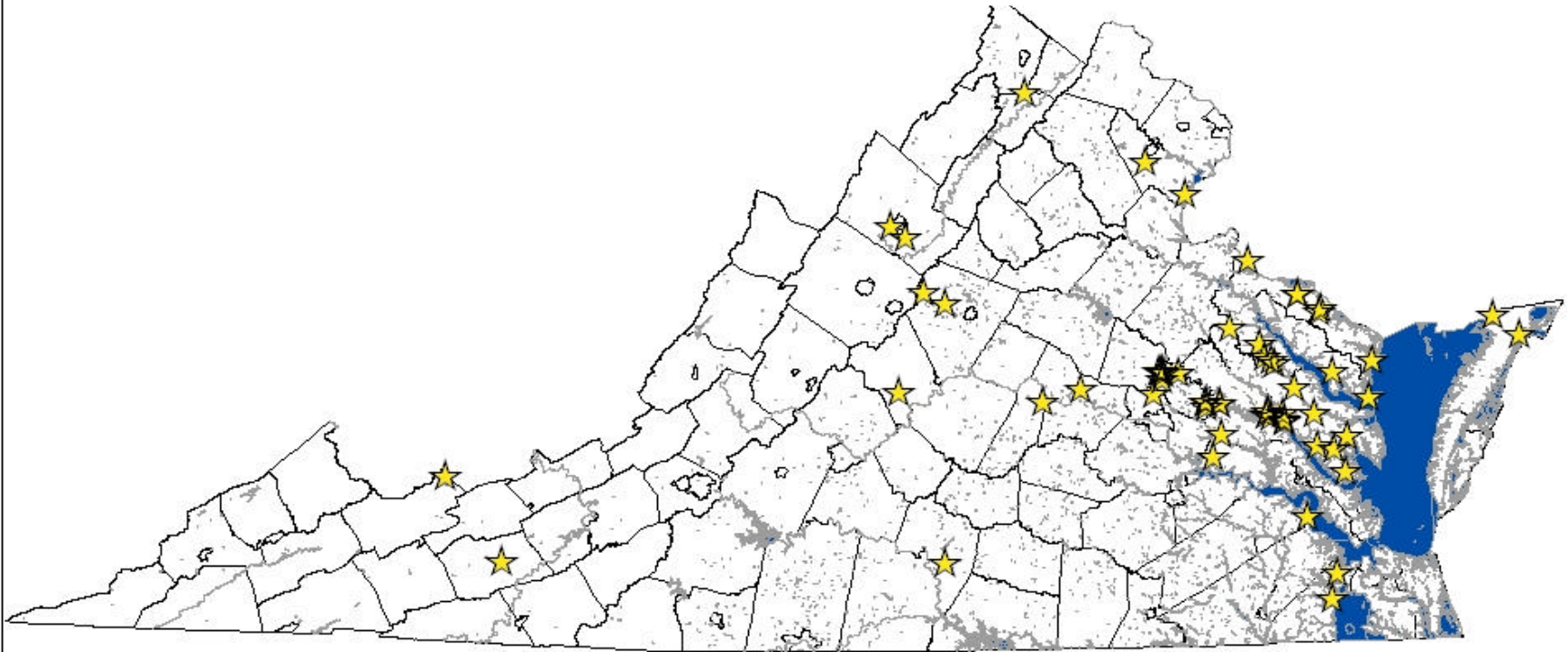

*Reservoir and Chowan Basin
Stations Not Included

Stations Not Assessed for DO

1 – 9 Data Points w/ 1 violation

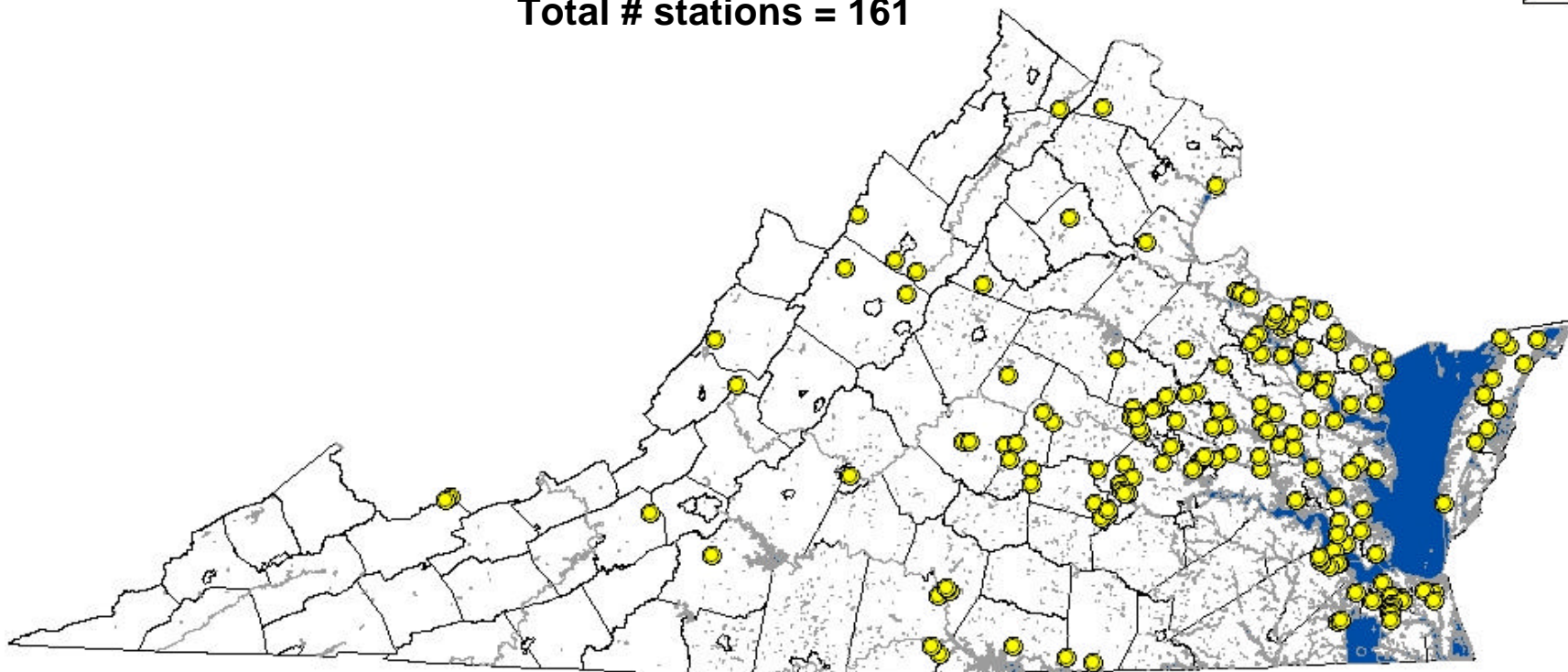**Total # stations = 59**

Legend

⭐ DO 1-9 Data Points w/ 1 Violation

This slide shows stations that would not be assessed for DO because of the '2-hit rule' (less than 10 data points and only 1 hit are not assessed).

**Stations Assessed as Unimpaired
DO Violations <= 10.5% of Total Data**

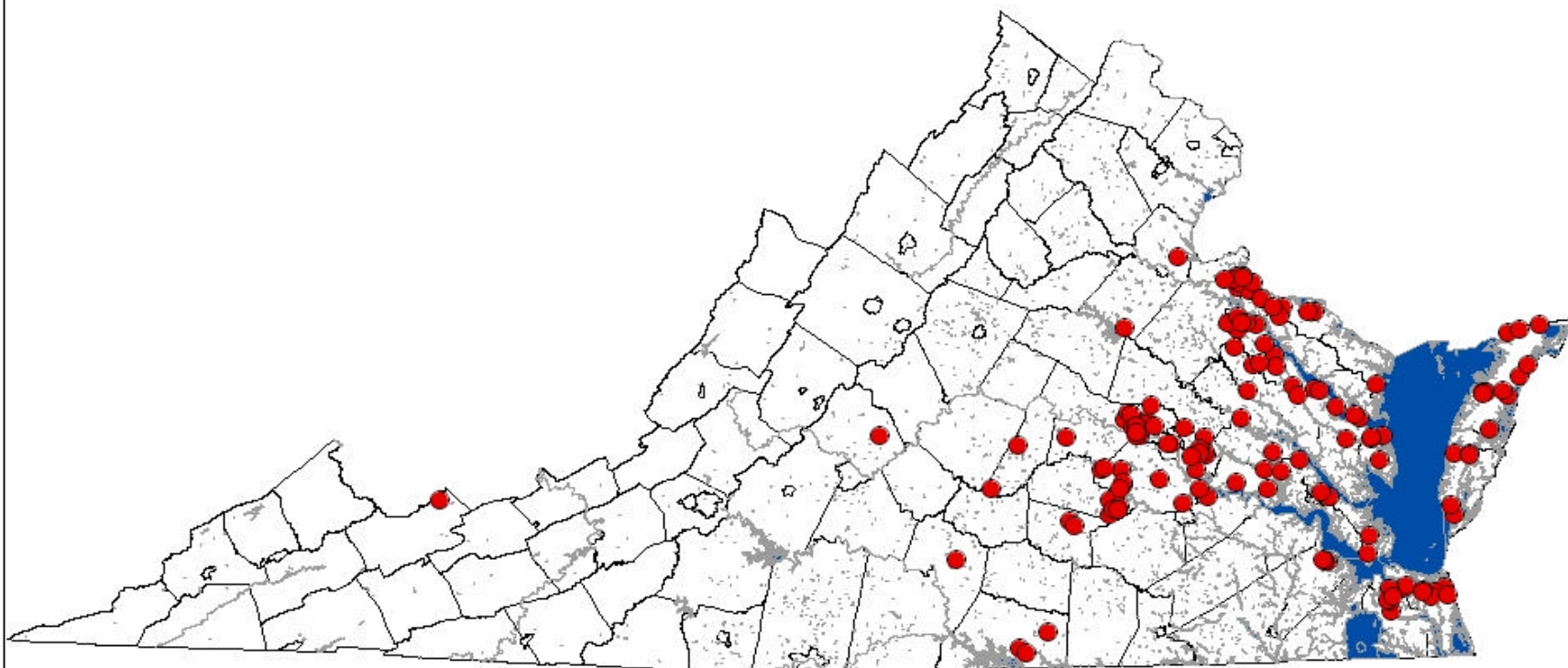**Total # stations = 161**

N

Legend

⬤ DO Violation <= 10.50% = Unimpaired

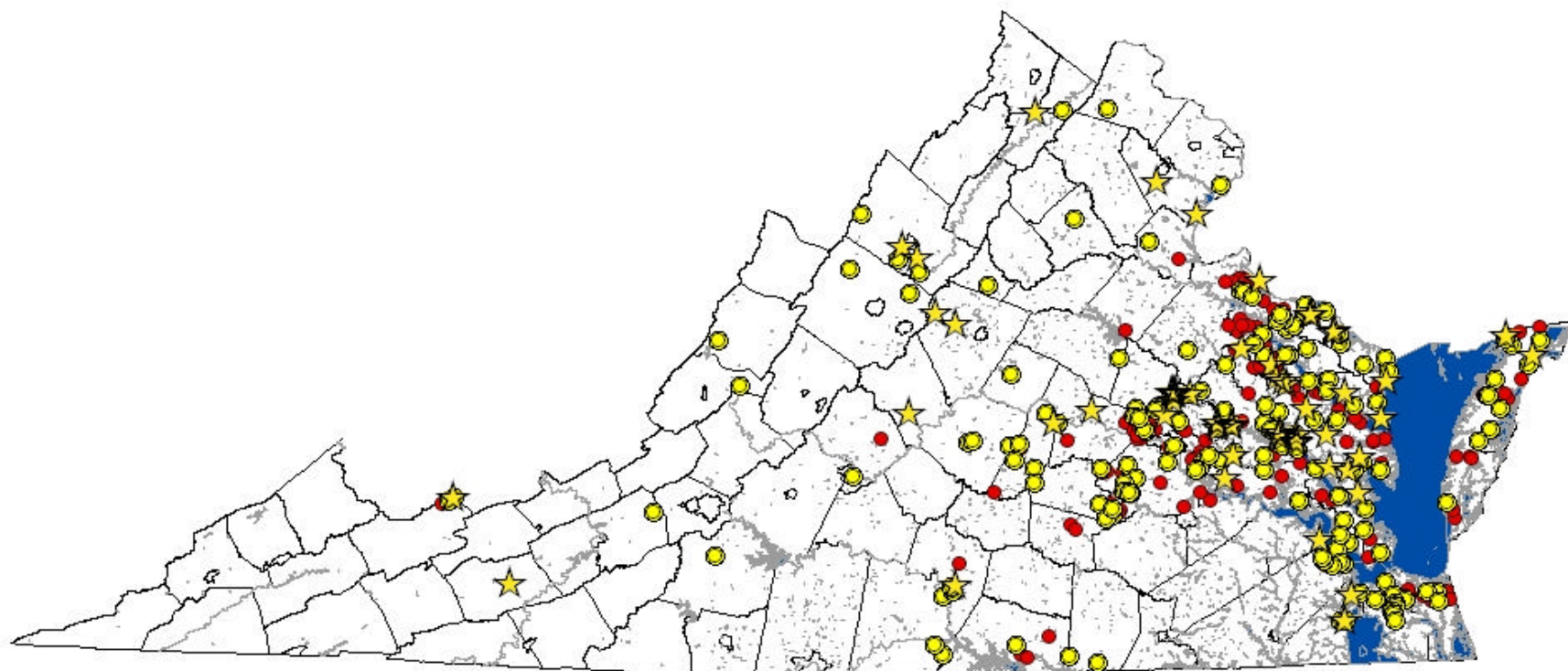**Stations Assessed as Impaired**
DO Violations > 10.5% of Total Data
Total # stations = 143

Legend

● DO Violation > 10.50% = Impaired (No Resv.)

Stations Impaired, Unimpaired, and Not Assessed for DO

Legend

- ⊙ DO Violation <= 10.50% = Unimpaired
- ● DO Violation > 10.50% = Impaired
- ★ DO 1-9 Data Points w/ 1 Violation

Stations w/ Zero DO violations Impaired, Unimpaired, and Not Assessed for DO

Total # stations w/ zero violations = 1813
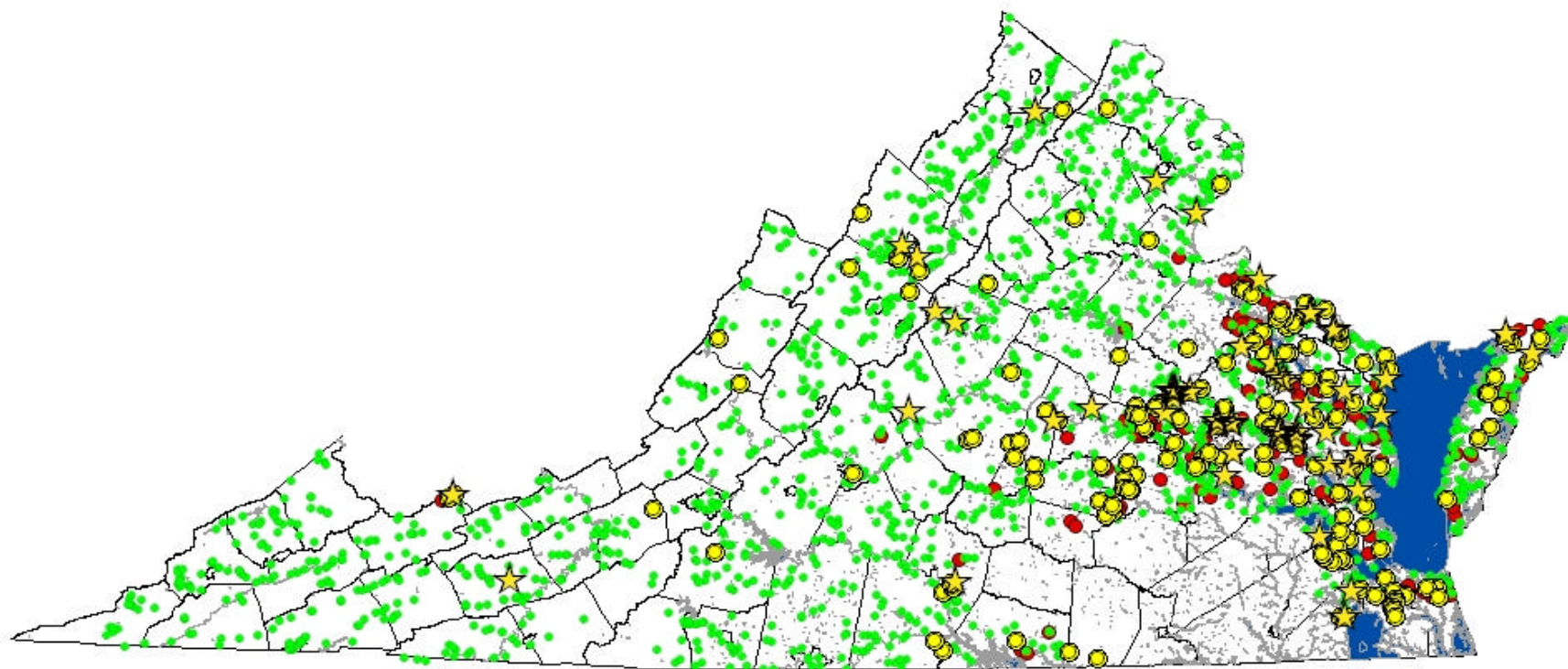
Legend

- DO Violations = 0
- DO Violation <= 10.50% = Unimpaired
- DO Violation > 10.50% = Impaired
- DO 1-9 Data Points w/ 1 Violation

10.5% Methodology in Action

Tuckahoe Creek

James Basin

Note the co-location of stations with impairments and those with no impairments in the following slide in the same watershed.

Stations Unimpaired, Impaired for DO
Tuckahoe Creek Tributaries

Broad Branch
data points - 26
violations - 0

Broad Branch
data points - 15
violations - 4

Broad Branch
data points - 15
violations - 2

Deep Run
data points - 34
violations - 4

Cabin Branch
data points - 13
violations - 1

Deep Run
data points - 29
violations - 4

Hanover

Goochland

Henrico

Powhatan

Chesterfield

Richmond City

Legend

● DO Violations = 0

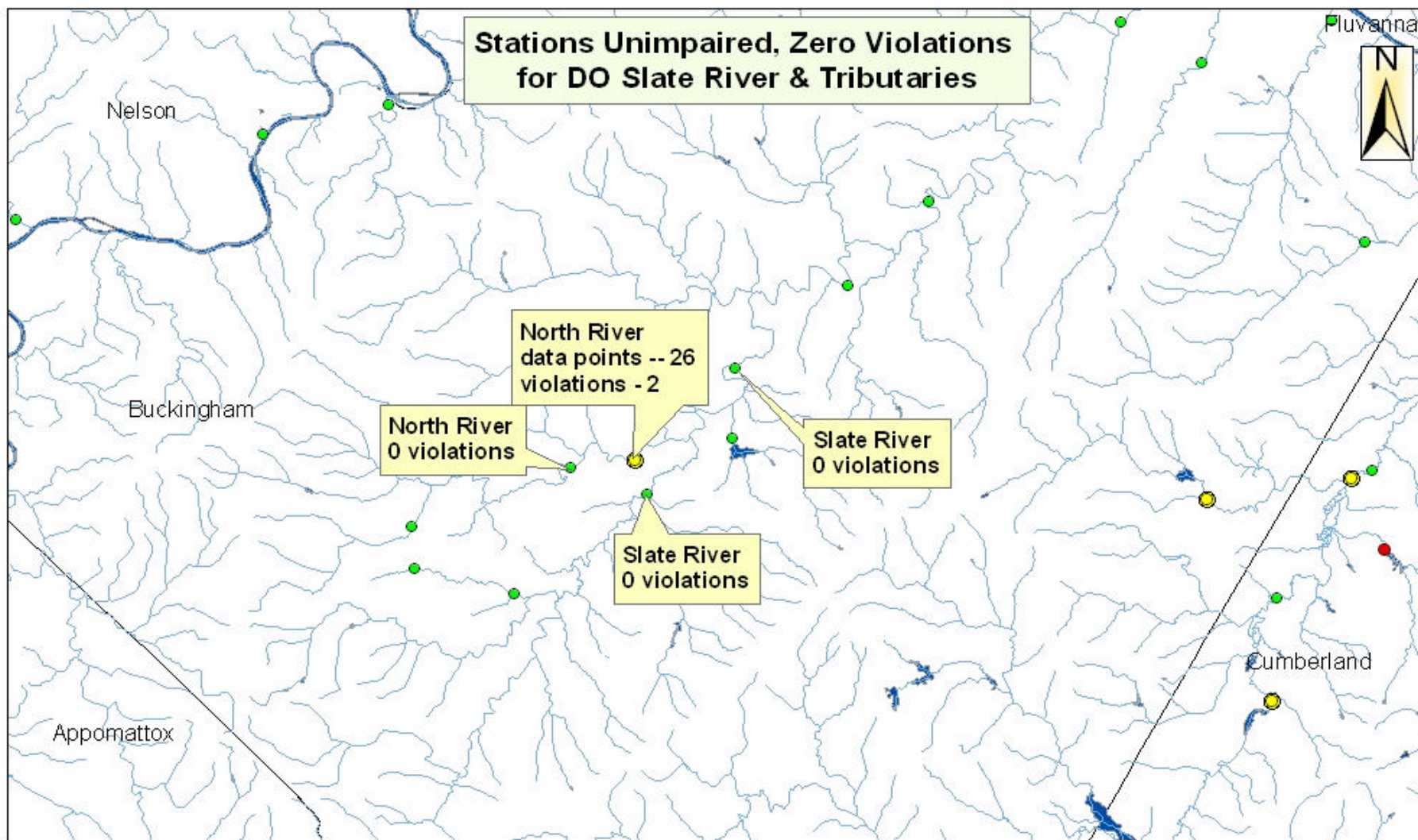◉ DO Violation <= 10.50% = Unimpaired

● DO Violation > 10.50% = Impaired

10.5% Methodology in Action

North and Slate Rivers

James Basin

North River would be listed as impaired under 'no rules' scenario. Slate River downstream zero violations

Stations Unimpaired, Zero Violations
for DO Slate River & Tributaries

Pluvanna

Nelson

Buckingham

North River
data points -- 26
violations - 2

North River
0 violations

Slate River
0 violations

Slate River
0 violations

Cumberland

Appomattox

Legend

- DO Violations = 0
- DO Violation <= 10.50% = Unimpaired
- DO Violation > 10.50% = Impaired
- DO 1-9 Data Points w/ 1 Violation

10.5% Methodology in Action

Cooks, Congers, Mill Creeks

SF Shenandoah

All would be listed as impaired under 'no rules' scenario.

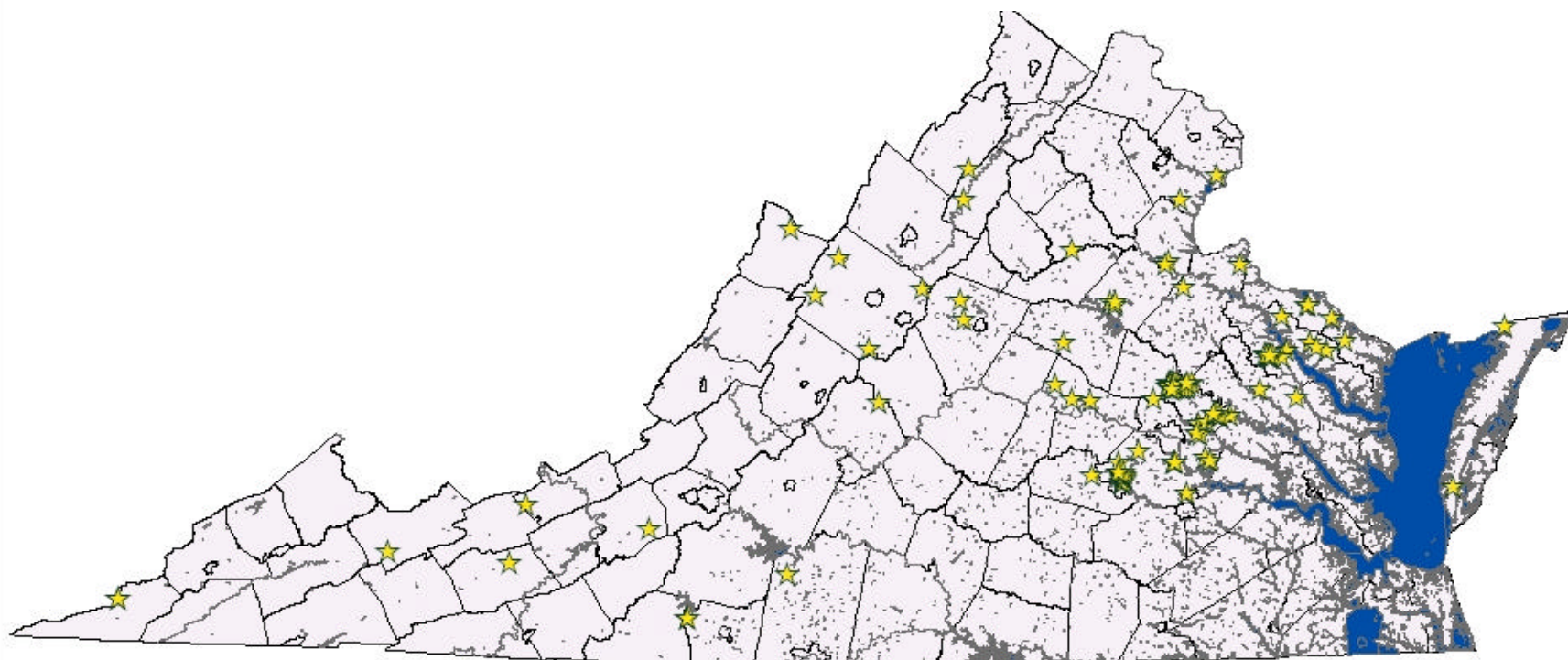**Stations Unimpaired, Unassessed for DO
SF Shenandoah Tributaries**
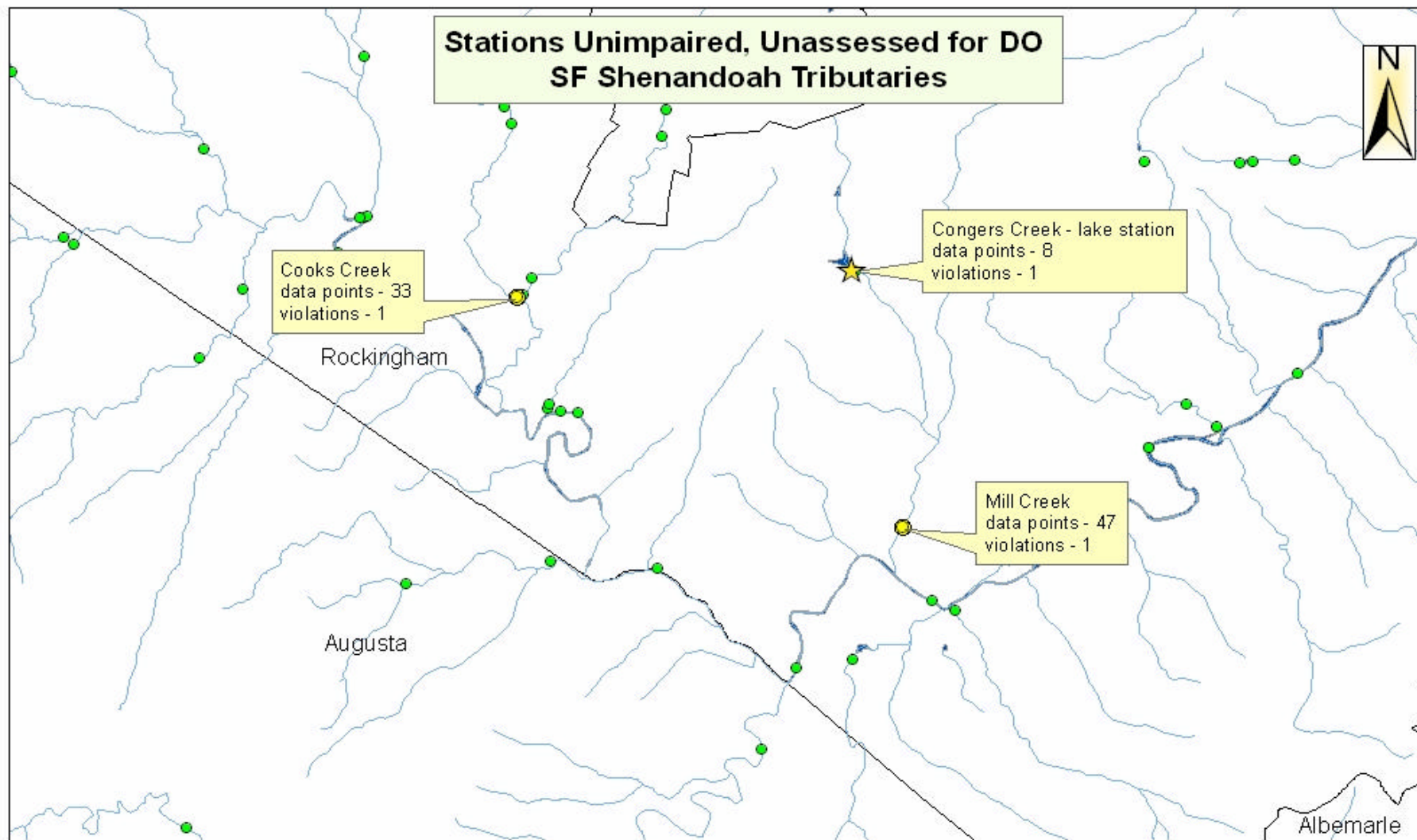
Cooks Creek
data points - 33
violations - 1

Congers Creek - lake station
data points - 8
violations - 1

Mill Creek
data points - 47
violations - 1

Rockingham

Augusta

Albemarle

Legend

- ● DO Violations = 0
- ◉ DO Violation <= 10.50% = Unimpaired
- ● DO Violation > 10.50% = Impaired
- ★ DO 1-9 Data Points w/ 1 Violation

Stations Not Assessed for pH

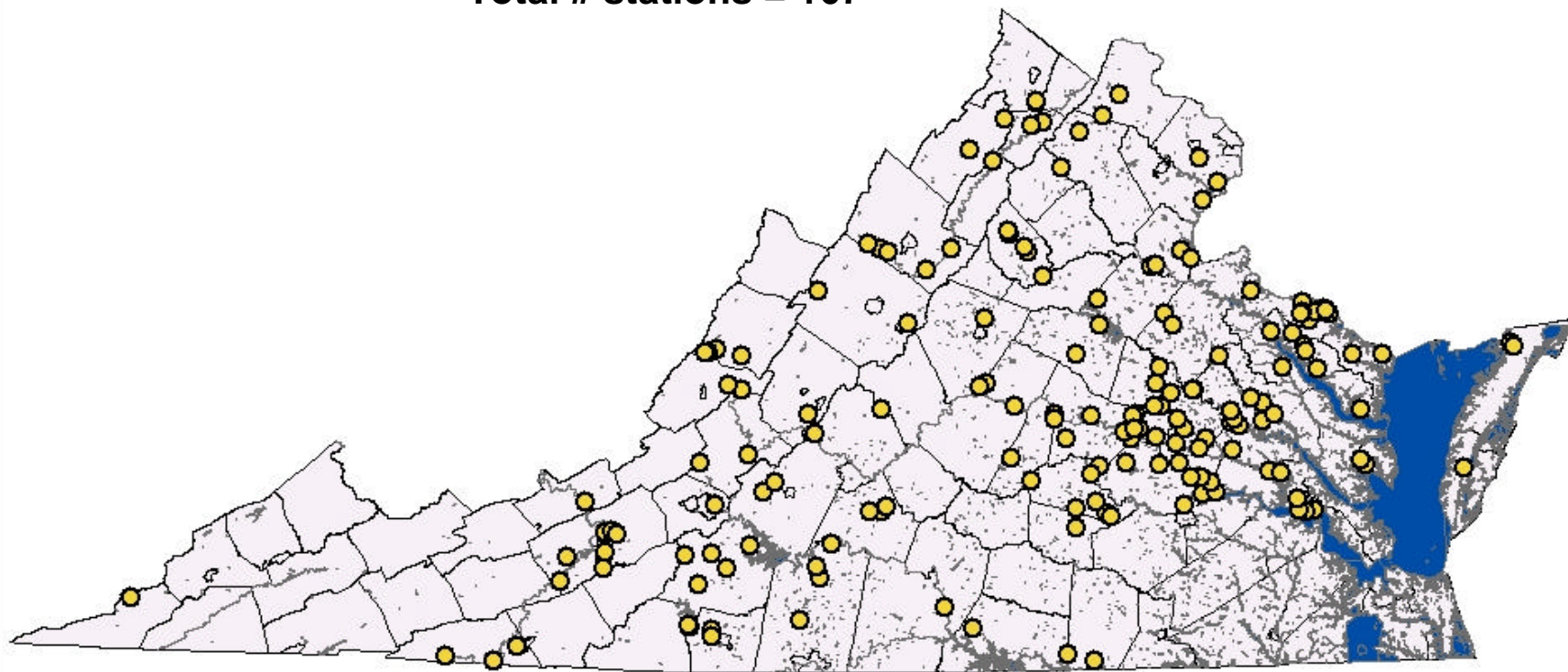**1 – 9 Data Points w/ 1 violation**

Total # stations = 158

Legend

☆ pH 1 - 9 Data Points w/ 1 Violation

This slide shows stations that would not be assessed for pH because of the '2-hit rule' (less than 10 data points and only 1 hit are not assessed).

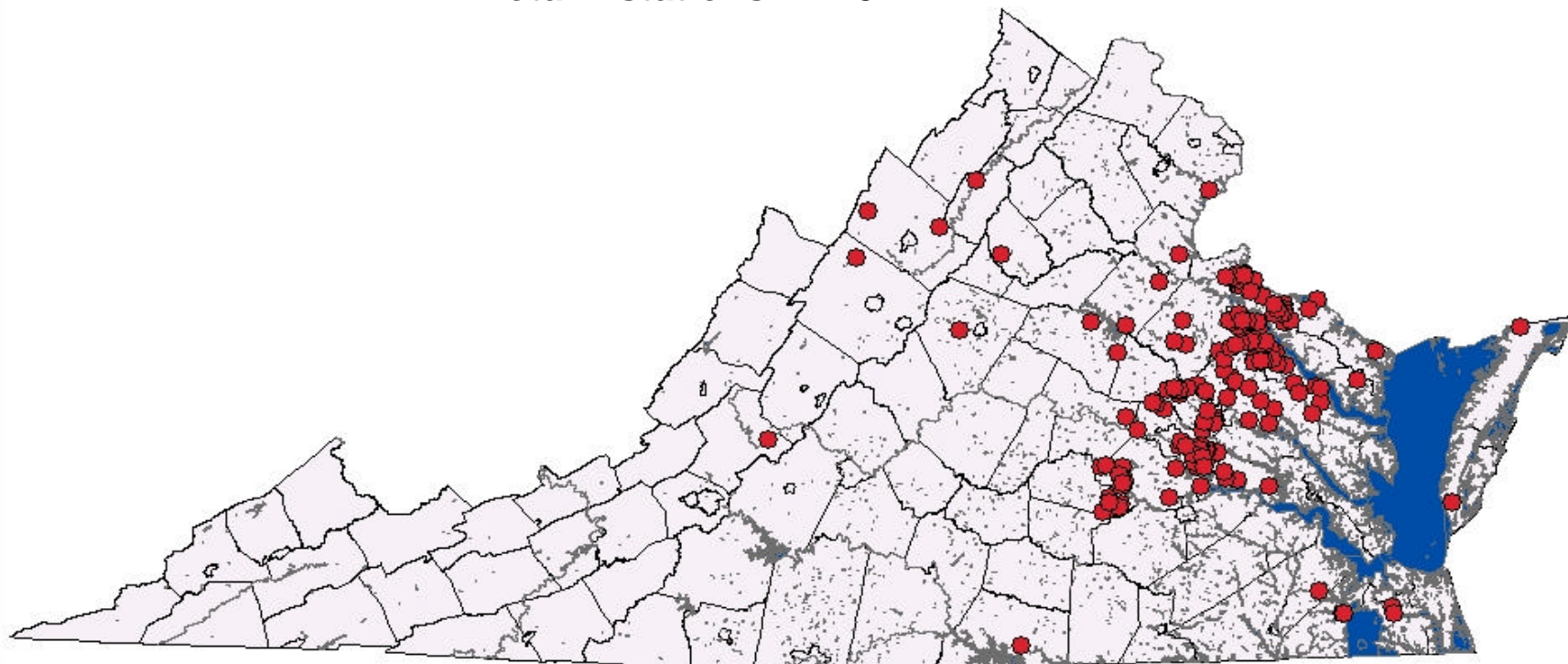Stations Assessed as Unimpaired
pH Violations <= 10.5% of Total Data

Total # stations = 167

Legend

○ pH Violations <= 10.5% = Unimpaired

Stations Assessed as Impaired
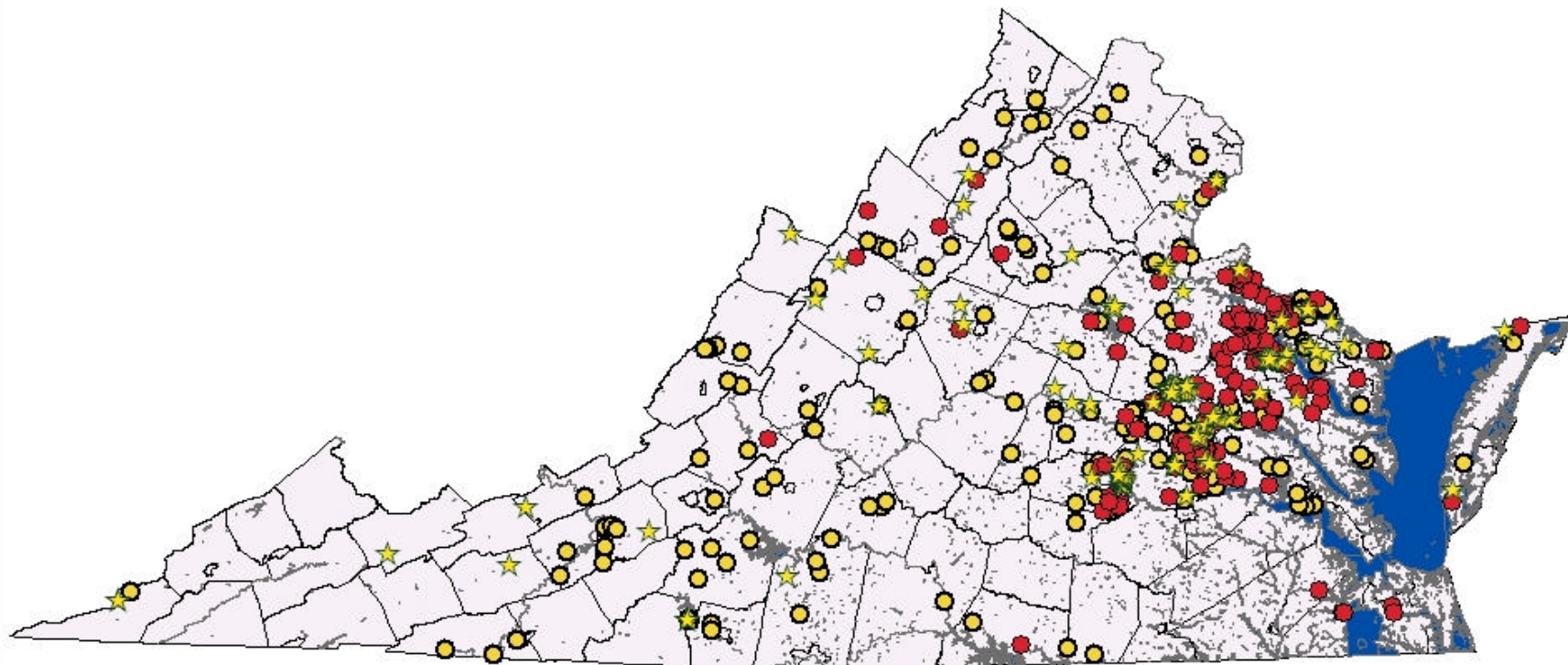**pH Violations > 10.5% of Total Data**

Total # stations = 175

Legend

● pH Violations > 10.5% = Impaired

Stations Impaired, Unimpaired, and Not Assessed for pH

Legend

- ⭕ pH Violations <= 10.5% = Unimpaired
- 🔴 pH Violations > 10.5% = Impaired
- ⭐ pH 1 - 9 Data Points w/ 1 Violation

Stations w/ Zero pH violations Impaired, Unimpaired, and Not Assessed for pH

Total # stations w/ zero violations = 1913

Legend

- ● pH Violations = 0 = Unimpaired
- ○ pH Violations <= 10.5% = Unimpaired
- ● pH Violations > 10.5% = Impaired
- ☆ pH 1 - 9 Data Points w/ 1 Violation

pH - Stations Impaired, Unimpaired, & Screened from Assessment - York Drainage, Hanover Co.

Caroline

King and Queen

51 data points
0 violations

148 data points
5 violations

12 data points
0 violations

Hanover

17 data points
2 violations

King William

Mechump Creek & tribs
all stars are 1 data point/
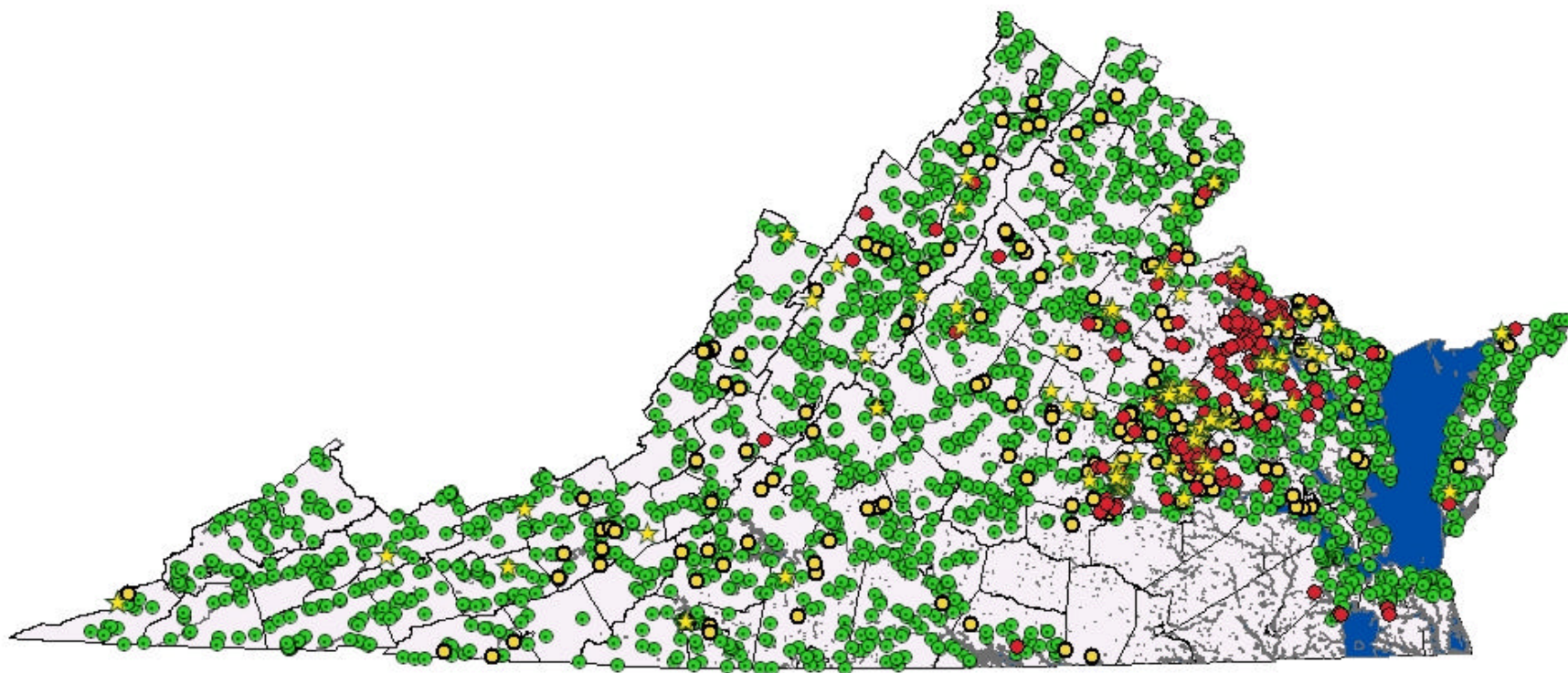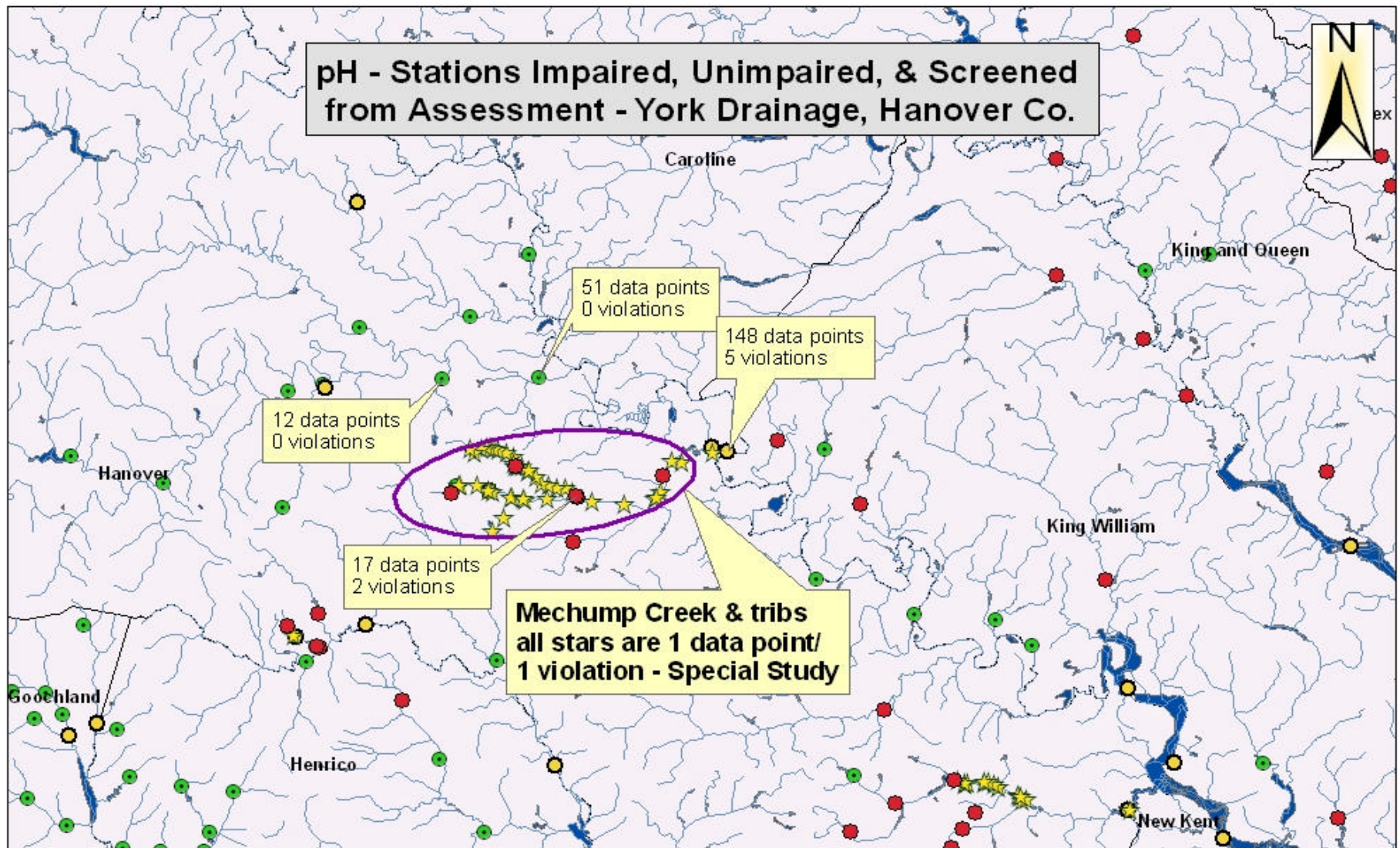1 violation - Special Study

Goochland

Henrico

New Kent

Legend

- pH Violations = 0 = Unimpaired
- pH Violations <= 10.5% = Unimpaired
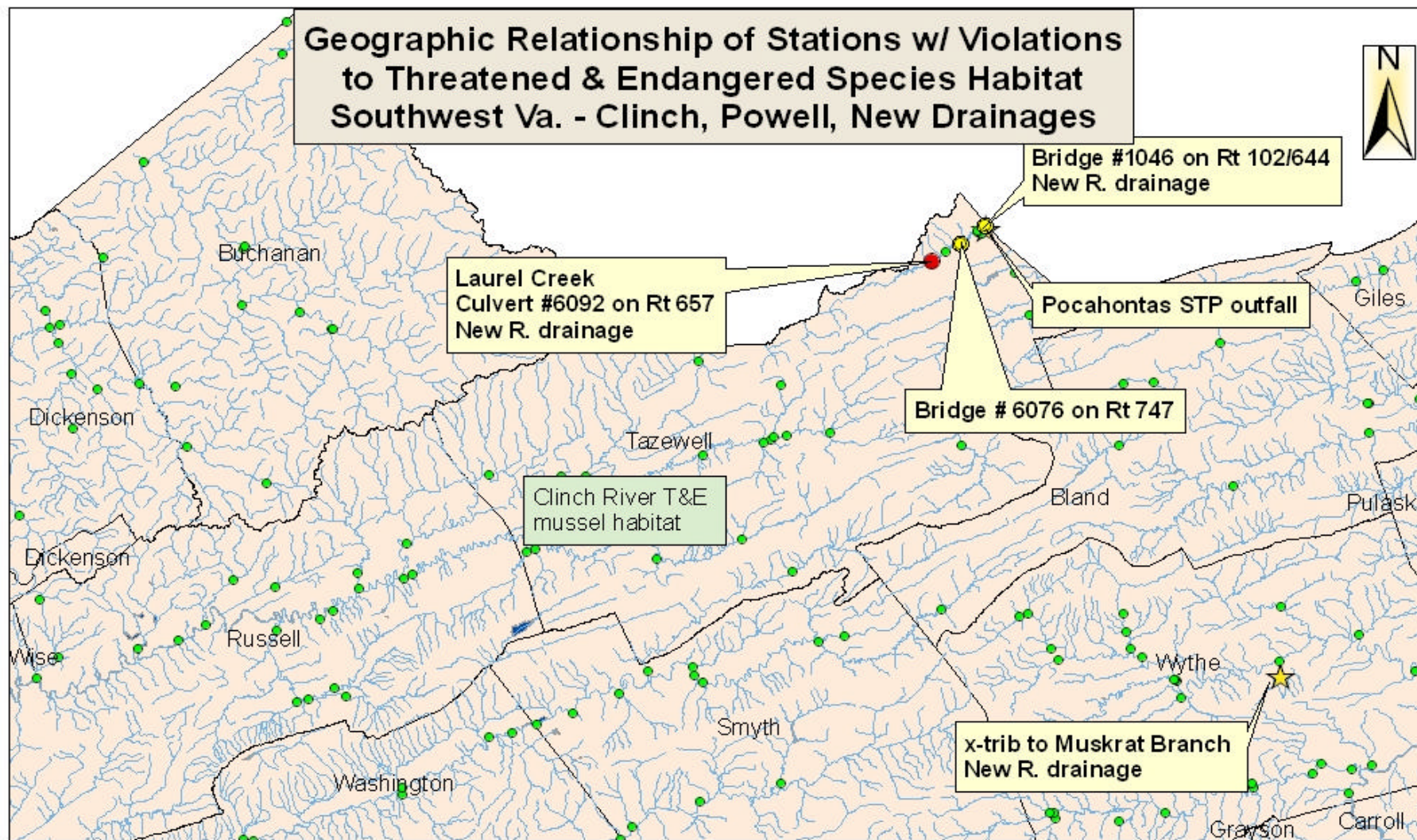- pH Violations > 10.5% = Impaired
- pH 1 - 9 Data Points w/ 1 Violation

Many unassessed stations have single data points and are a result of Special Studies.

DO Violations w/i Threatened & Endangered Species Waters

The following slides illustrate the geographic relationship of stations, assessed and unassessed for DO, to T&E species habitat.

Upper Roanoke, Upper James, and Middle James were only areas with T&E waters with fully aquatic species (mussels, fish) containing stations with DO violations directly within the T& E water body or within the immediate watershed.
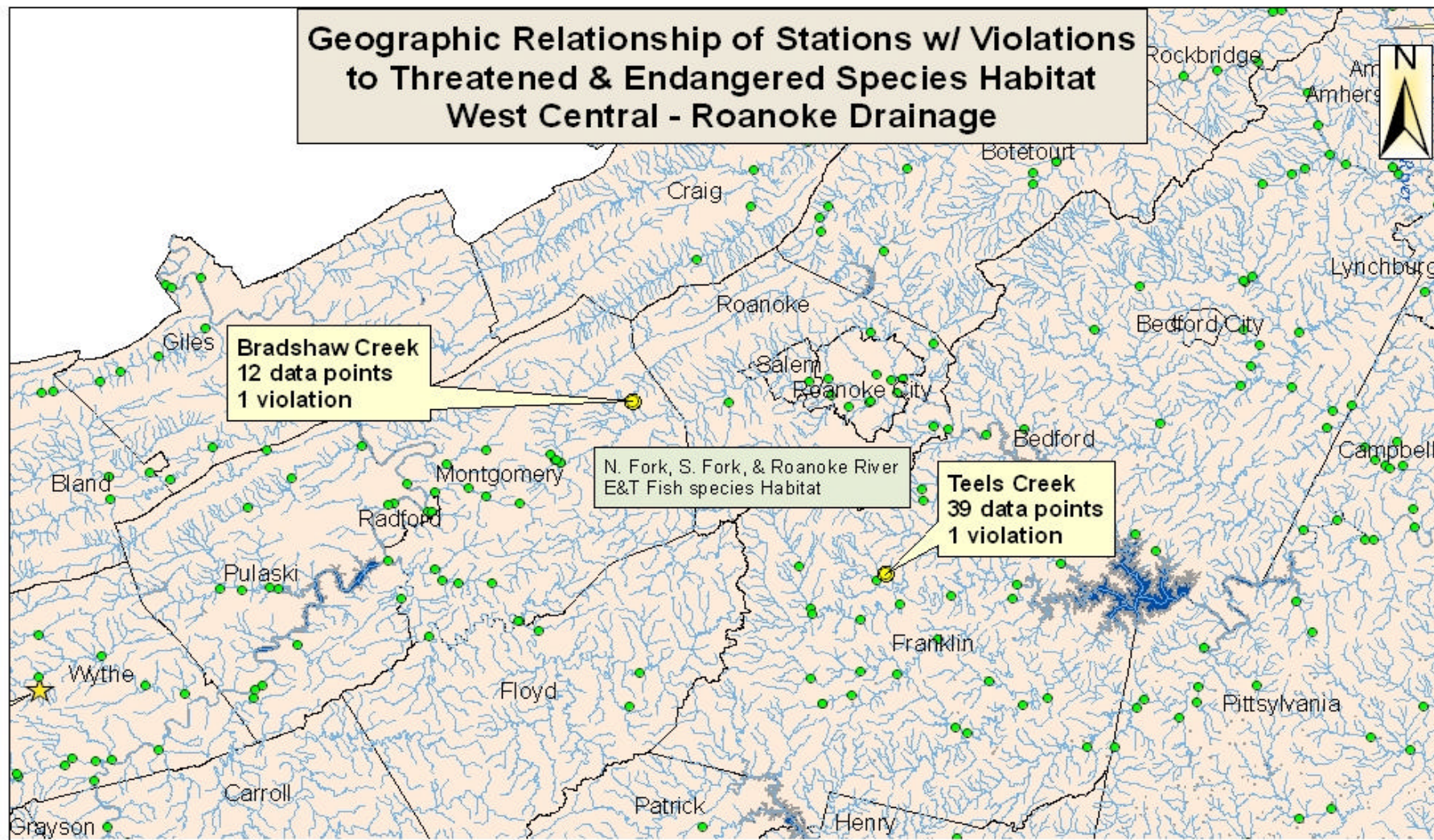
Geographic Relationship of Stations w/ Violations to Threatened & Endangered Species Habitat Southwest Va. - Clinch, Powell, New Drainages

0 DO violations w/i Clinch/Powell/ Holston drainage

Geographic Relationship of Stations w/ Violations to Threatened & Endangered Species Habitat West Central - Roanoke Drainage
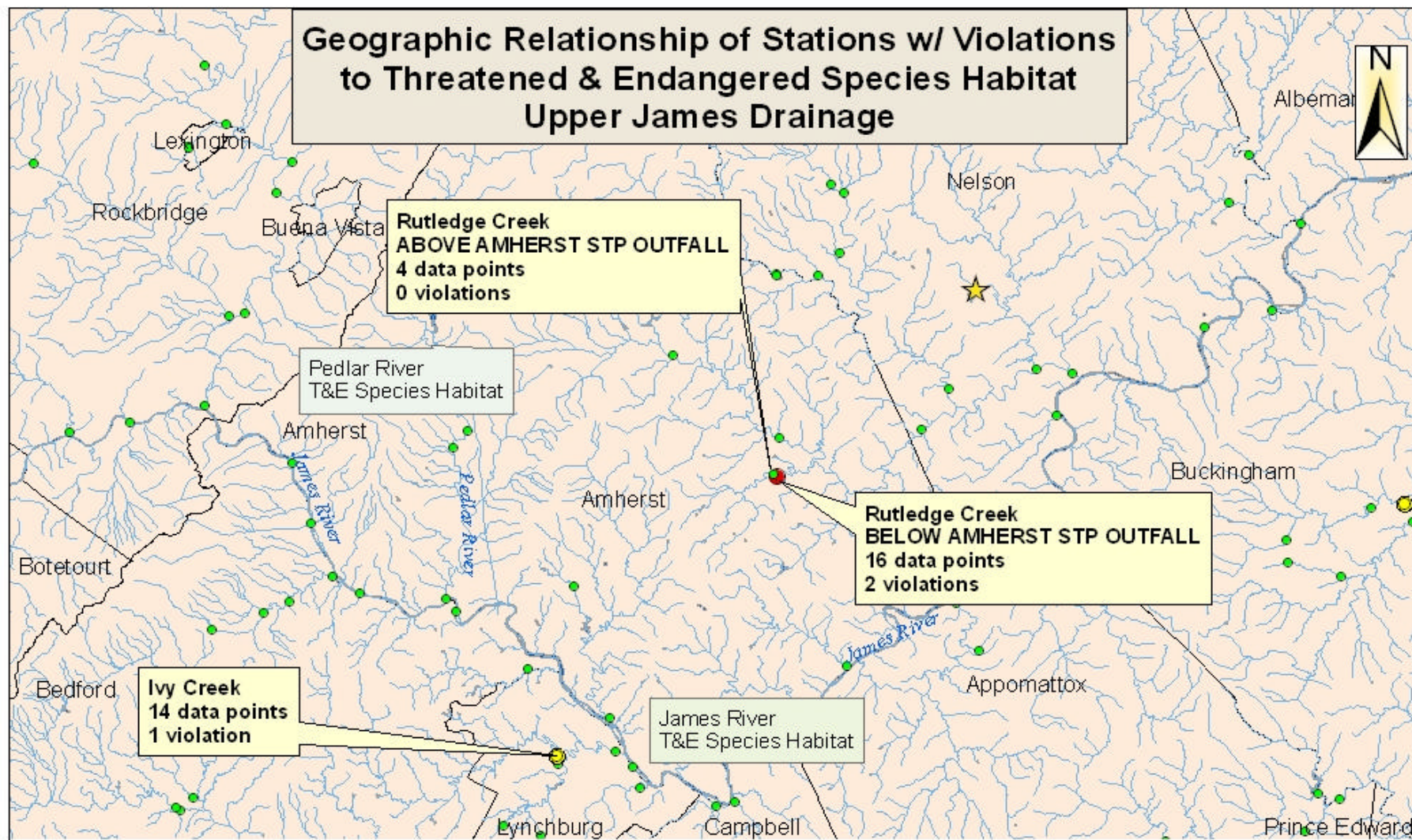
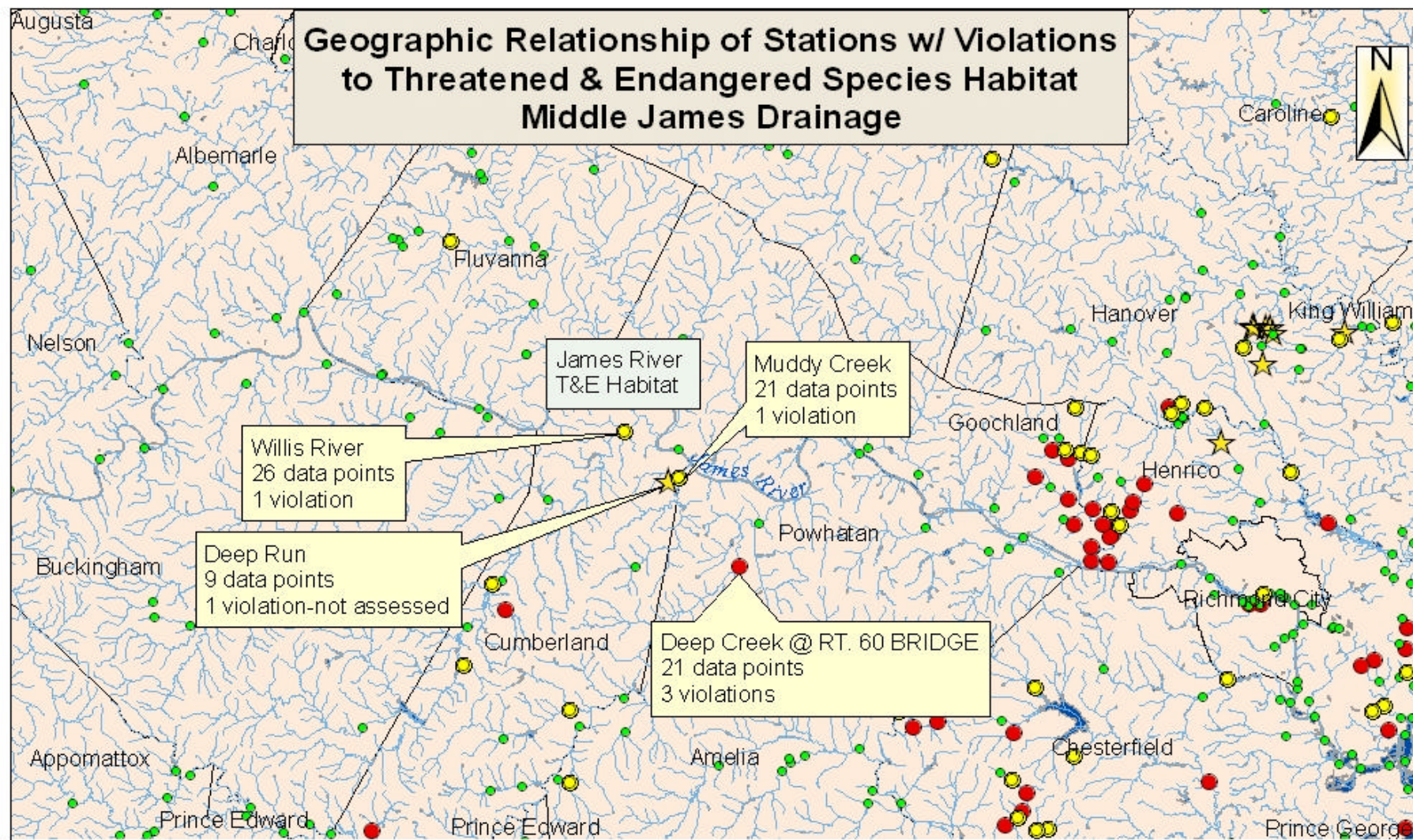Geographic Relationship of Stations w/ Violations to Threatened & Endangered Species Habitat Upper James Drainage

Geographic Relationship of Stations w/ Violations to Threatened & Endangered Species Habitat
Middle James Drainage

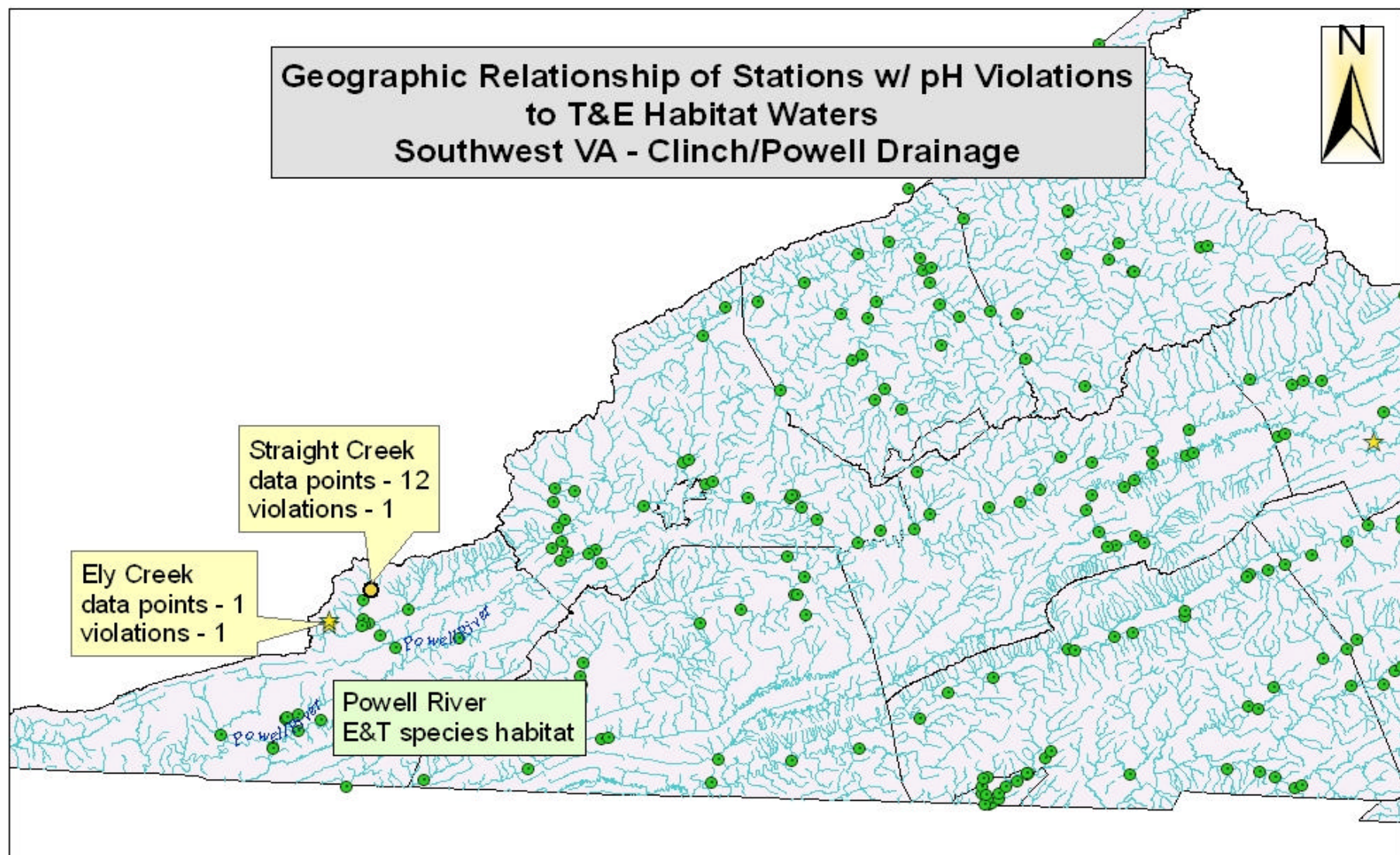# pH Violations w/i Threatened & Endangered Species Waters

The following slides illustrate the geographic relationship of stations, assessed and unassessed for DO, to T&E species habitat.

Geographic Relationship of Stations w/ pH Violations
to T&E Habitat Waters
Southwest VA - Clinch/Powell Drainage

Straight Creek
data points - 12
violations - 1

Ely Creek
data points - 1
violations - 1

Powell River
E&T species habitat

Legend

- ● pH Violations = 0 = Unimpaired
- ◉ pH Violations <= 10.5% = Unimpaired
- ● pH Violations > 10.5% = Impaired
- ★ pH 1 - 9 Data Points w/ 1 Violation

Geographic Relationship of Stations w/
pH Violations to T&E Habitat Waters
West Central - Roanoke&James Drainage

James River-Rt. 614 bridge
data points - 18
violations - 2
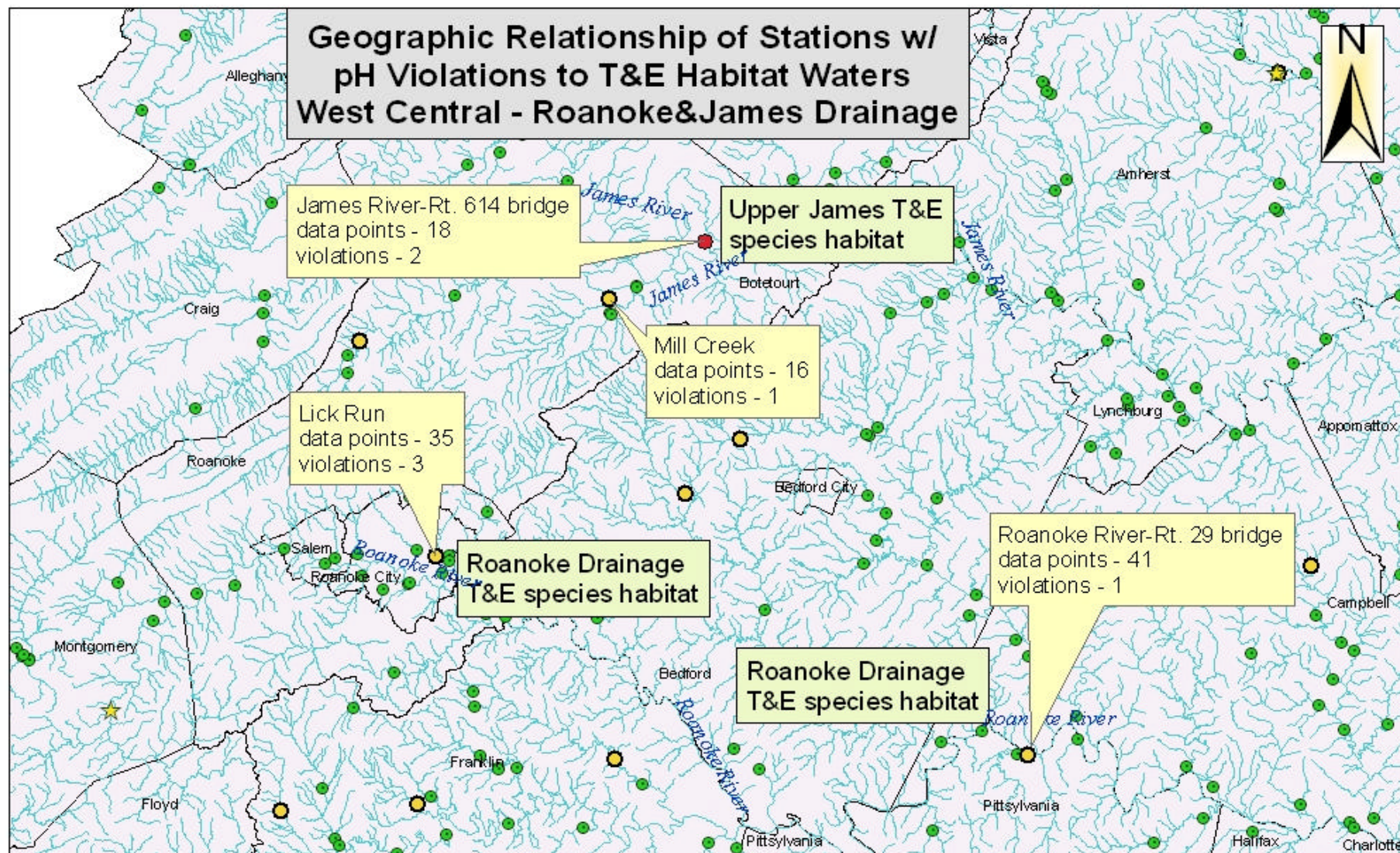
Upper James T&E
species habitat

Mill Creek
data points - 16
violations - 1

Lick Run
data points - 35
violations - 3

Roanoke Drainage
T&E species habitat

Roanoke River-Rt. 29 bridge
data points - 41
violations - 1

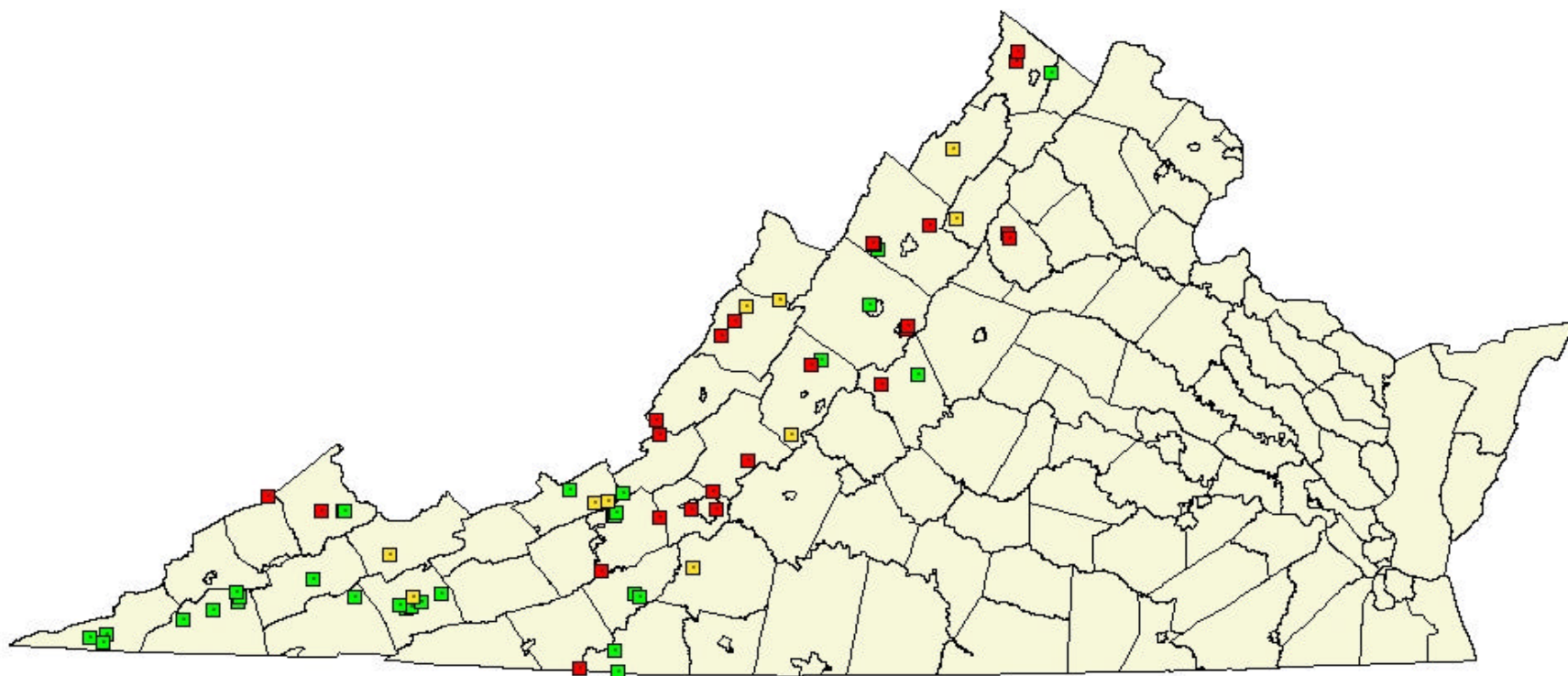Roanoke Drainage
T&E species habitat

Legend

- pH Violations = 0 = Unimpaired
- pH Violations <= 10.5% = Unimpaired
- pH Violations > 10.5% = Impaired
- pH 1 - 9 Data Points w/ 1 Violation

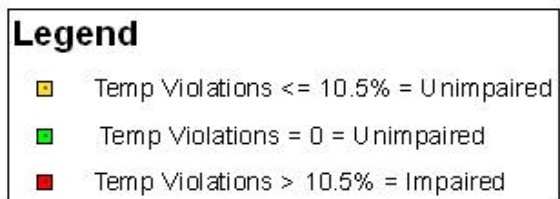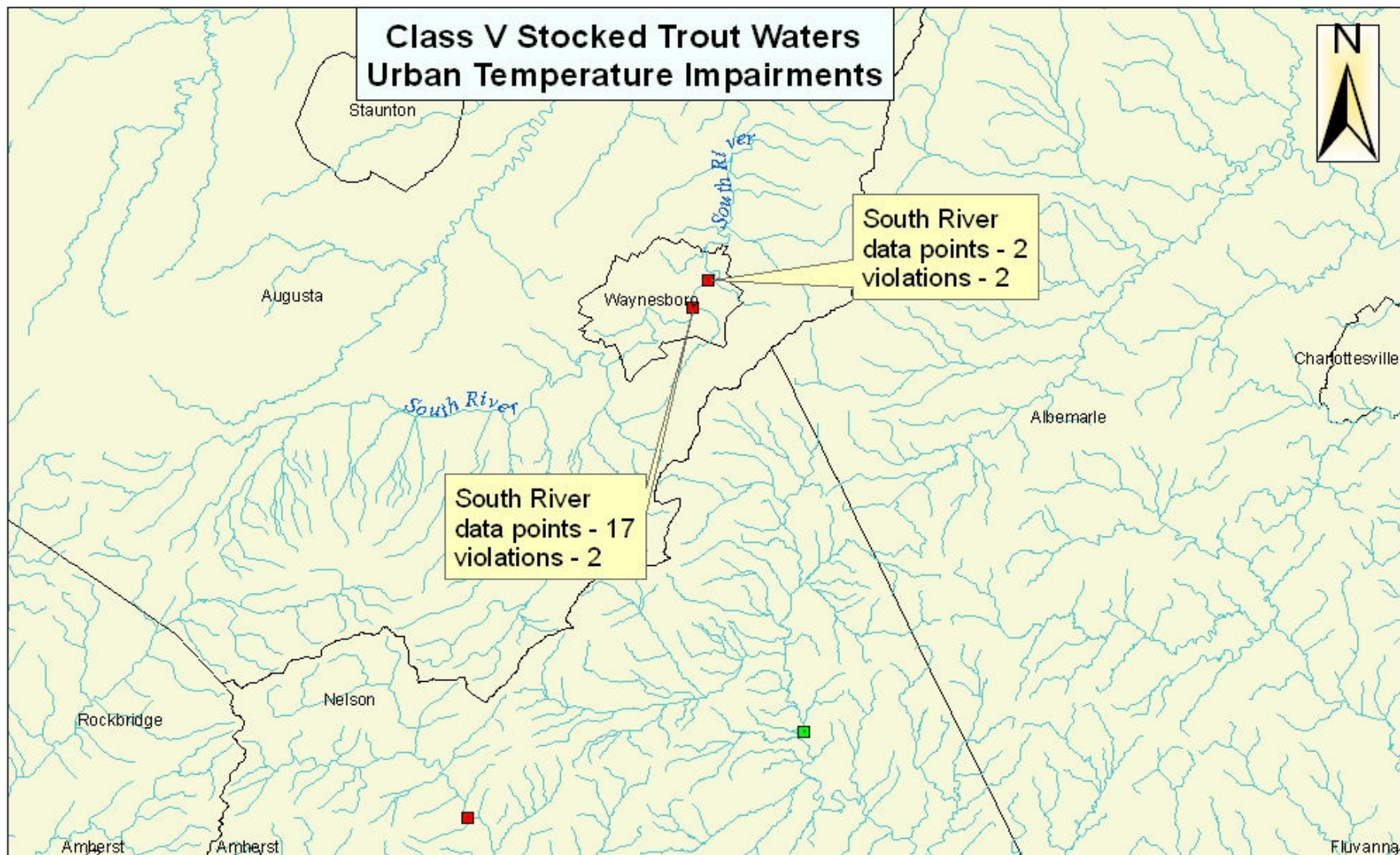Class V Stocked Trout Waters
Stations Unimpaired, Impaired, &
w/ Zero Violations for Temperature

N

Legend

▫ Temp Violations <= 10.5% = Unimpaired

■ Temp Violations = 0 = Unimpaired

■ Temp Violations > 10.5% = Impaired

**Class V Stocked Trout Waters
Urban Temperature Impairments**

N

Staunton

South River

Augusta

Waynesboro

Charlottesville

South River
data points - 2
violations - 2

South River

Albemarle

South River
data points - 17
violations - 2

Rockbridge

Nelson

Amherst   Amherst

Fluvanna

Legend

□ Temp Violations <= 10.5% = Unimpaired

■ Temp Violations = 0 = Unimpaired

■ Temp Violations > 10.5% = Impaired

Class V Stocked Trout Waters
Urban Temperature Impairments

Tinker Creek @ Rt. 11
Hollins College

Roanoke River
data points - 28
violations - 5

Tinker Creek
data points - 52
violations - 12

Roanoke River - Town of Lafayette
data points - 51
violations - 8

Legend

☐ Temp Violations <= 10.5% = Unimpaired

☐ Temp Violations = 0 = Unimpaired

☐ Temp Violations > 10.5% = Impaired